

ED 153 713

PS 005 666

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TITLE Differential Effects of Television Programming on Preschoolers' Cognition, Imagination and Social Play.
PUB DATE [77]
NOTE 43p.; Tables and figures have been filmed from best available copy
EDRS PRICE MF-\$0.83 HC-\$2.06 Plus Postage.
DESCRIPTORS Affective Behavior; Behavior Patterns; *Childrens Television; Cognitive Processes; *Imagination; Individual Differences; Intelligence Level; Learning Processes; Peer Relationship; *Play; *Preschool Children; *Recall (Psychological); Social Relations; Stimulation; Television Research; *Television Viewing
IDENTIFIERS *Misterogers Neighborhood; *Sesame Street

ABSTRACT

This paper reports on an experiment to determine (1) the effects of two different styles of television program format on the ability of preschool children to recall program content and (2) the cumulative effect of sustained viewing of particular programs upon spontaneous play behavior. Three groups of preschoolers (totaling 58) were exposed to two weeks' daily viewing of either "Misterogers' Neighborhood," "Sesame Street," or a control series of nature and animal films. Hypotheses tested considered whether format differences designed for constructive impact actually yielded such results, and the extent to which format may have special impact due to developmental and personality differences among children. Interactions of child age, sex, IQ and imaginativeness with the stimulus conditions were considered. Results included indications that the slower paced format and other characteristics of the "Misterogers" program yielded positive changes, especially for initially less imaginative children, in imaginativeness of play, positive affect, concentration and social interaction with adults and peers. (BF)

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**DIFFERENTIAL EFFECTS OF TELEVISION PROGRAMMING
ON PRESCHOOLERS' COGNITION, IMAGINATION AND
SOCIAL PLAY**

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Differential Effects of Television

Abstract

Three groups of preschoolers (N=58) were exposed over two weeks to daily programs of either Misterogers' Neighborhood, Sesame Street, or a control series of nature and animal films. Specific hypotheses about the effects of program format upon recall of content and upon subsequent behavior were tested. Results indicated that the apparently more slow-paced format and other characteristics of the Misterogers' program yielded positive changes, especially for initially less imaginative children, in imaginativeness of play, positive affect, concentration and social interaction.

Differential Effects of Television

Programming on Preschoolers' Cognition, Imagination
and Social Play

Television may be a major socializing agent in the young child's life. It influences anger following frustration (3), aggression (13, 14, 23, 27, 35), attitudes toward violence (10, 11, 19) and attitudes toward sex (18). It can be a powerful modeling force for the preschool child, increasing imaginativeness of play (36, 43), interaction with others (8, 9) and such "prosocial" behaviors as cooperation, nurturance, verbalization of feelings, rule obedience, delay tolerance, persistence, and instrumental help seeking (16, 17, 43, 44).

Despite the demonstrable impact of the television medium on children's behavior and attitudes, surprisingly little systematic attention has been paid by producers or behavioral scientists to the components of programming that have constructive potential for young viewers. Most programming is commercial and oriented towards what producers assume will be most entertaining. Even those few shows designed specifically for children with a mixture of educational and entertainment objectives may often yield results that have negative behavioral implications (1, 5, 6, 22, 29, 46). Halpern (20)

reported that over-active children coming to mental health clinics seemed to have been excessively aroused by the "hyped-up" format of Sesame Street. Clearly, we need to pay more careful attention to the structural properties of programming and to consider the special effects that such formats may have on children at different ages or intellectual levels.

The research to be described herein represents such an effort. We sought to examine the effects of two different styles of television programming format on the ability of preschool children to remember material presented immediately after the program's conclusion. We also examined the cumulative effect of sustained viewing of particular programs upon spontaneous play behavior. Do systematic format differences in programs presumably designed for constructive impact upon children actually yield results in accord with such intentions? We also sought to explore the extent to which program format may have special impact on children who bring particular differences in maturity or personality predispositions to the viewing situation. The report is divided into two studies, one examining memory for program content after viewing, the other reporting on cumulative-viewing effects on play. We chose two programs especially designed for children, in effect the "best" available programming, as our examples to see if even these shows which were produced with

a conscious concern about the child's welfare might have differential impacts on cognition and behavior.

There is evidence that characteristics of the child who is viewing have effects on what he will remember, either verbally, as evidenced through recall of content tests, or visual-motorically, as seen in behavioral changes (21). Child characteristics considered in this study included age, sex, I.Q., and imaginativeness.

Characteristics of the programs

Stimulus format. Misterogers Neighborhood and Sesame Street are television programs designed to educate and to entertain the preschool child. Sesame Street (SS) is a fast-paced, magazine format show which makes extensive use of production techniques such as black-outs, pixilation and cartoons; it repeats "lessons" frequently and stresses cognitive learning. Recently, and in the videotapes used in the present experiment, the teaching of pro-social behaviors has been added. SS presents a variety of adults, unrehearsed children, puppets and cartoon characters to deliver its messages. Distinctions between the "real" and "pretend" are not always explicitly drawn.

In other words, SS assumes that children learn best when stimulation is multi-sensory and when their visual attention is directed toward the set; that the most effective way short of violent content to hold that attention is through novel and surprising visual and auditory effects; that children respond most to puppets and other children; and that repetition is the most efficient method of teaching (22). The major criterion for retaining a film sequence has been its ability to hold the child's visual attention. Research has

accumulated indicating that children do indeed learn the "curriculum" which SS sets out to teach; that the more they watch it, the more they learn from it; and that children who watch with their mothers learn the most (1, 4, 22).

Of particular interest is SS's reliance on the cumulative effects of watching. Indeed, the child learns little from three showings but does learn from six (22). Could the format, by being so stimulating, actually interfere with immediate learning? Lack of rehearsal opportunity because of the pace of the program and interference effects stemming from its liveliness might compound distortions arising from the preschool child's associational thinking (31, 32, 34), particularly for less intelligent children.

In contrast, Misterogers Neighborhood (MR) is slow in pace, generally carries a few themes throughout an entire program, often provides continuity of story lines or themes throughout a week or more, features a small number of adults addressing the viewing children directly and uses puppets in a clearly defined "Neighborhood of Make-Believe." MR has a stronger emphasis on pretending than does SS, uses only positively reinforced interactions in contrast to the nearly fifty percent negatively reinforced incidents of SS (8, 9) and concentrates on delivering social and affective messages rather than developing cognitive skills. Through the low-key presentations of clearly pro-social and self-validating material, the child is given time and encouragement for self-acceptance for enjoying imaginative abilities, and for developing alternative behaviors when faced with conflict or frustration.

The assumptions underlying MR programming seem to be that children learn best when they have ample time to rehearse material, when novelty is not too

great, when information builds on that previously presented and presumably assimilated, when an adult acts directly as an intermediary with the child, and when labeling is provided for the child. These beliefs are more fully in accord with Piagetian (31, 32, 34) and social learning models (2) of how a preschool child learns than the conditioning model which seems to underlie SS.

Hypotheses

Type of information. Factual information, that which is verbally and visually presented to the child unambiguously and directly, was hypothesized to be more likely to be remembered than inferential material, that which required the child to abstract meaning from situations not clearly labeled. In addition, it was hypothesized that the type of information would interact with stimulus format, with the simple direct format of MR producing higher recall of factual information and the complex format of SS, with a smaller proportion of explicitly stated messages, leading to superior inferential recall. Factual information was also examined by recognition and recall methods. The former presents a stimulus already seen and simply requires an indication that it is remembered. Recall testing involves active retrieval of information by the child.

Age. The importance of a child's age for TV-viewing has been demonstrated by Ward, Wackman and Wartella (46).

It was hypothesized that, even within our narrow sample of nursery school children, older children would remember more than younger ones regardless of stimulus format (program) or type of information.

Intelligence. Findings by Singer & Lenahan (37) and Lyle & Hoffman (24) suggest that high IQ children may be using television as input for content and strategies and therefore learning more from it.

It was hypothesized that more intelligent children would remember more from the complex stimulus format of SS which limits rehearsal opportunities than would children of average intelligence but that the difference would disappear with the simpler, slower format of MR. In addition, the analogical abilities of the more intelligent child were expected to permit him/her to form and remember more inferences from either stimulus format.

Sex. In a study comparing verbal and behavioral learning of preschool children who watched Misterogers' Neighborhood, Stein and Friedrich (44) found that boys were more likely to show behavioral learning than girls while girls were better able to reiterate the verbal message of a program. When learning was facilitated by verbal labeling or role playing or both, boys showed more gains in prosocial behaviors with role playing training while girls showed improvement if they had both. Therefore, since no explicit verbal labeling supplementary to the programs themselves was to be used in the current experiment, it was hypothesized that boys would show greater behavioral gains than girls. Again, the difference was expected in the Misterogers and Sesame Street conditions only and not for the control showing of animal and nature shows which did not stress verbal labeling.

Imaginativeness. Research on imaginativeness of a child's play has shown it to be a significant variable in the ways in which a child interacts with the environment. Imaginative children remember more details of stories with more

accuracy (45), exhibit superior social skills (25, 36, 38, 41, 42), reveal more positive affect and greater concentration (3, 33, 39).

They can respond to situations with less impulsivity and more internal control (15, 28). It was hypothesized that more imaginative children, because of their already high levels of imaginativeness, positive affect, concentration and interaction with peers, might show less dramatic changes from television-viewing than would their less imaginative peers. Again, no differences in the children viewing the control films was expected, because the modeling influences were not present. Gains in imaginativeness of play for children who were initially less imaginative were expected to be greater for those watching Misterogers' Neighborhood than for those watching Sesame Street, because of the stronger stress placed upon imaginative development in the former program.

In summary, the experiment was designed to determine some effects on memory following Sesame Street or Misterogers and on ongoing spontaneous play produced by the two contrasting stimulus formats. Further, interactions of a child's age, sex, IQ and imaginativeness with the stimulus conditions were considered as they influenced imaginativeness, positive affect, concentration, interaction and cooperation with adults and interaction and cooperation with peers.

METHOD

Fifty-eight white middle-class nursery school children were randomly assigned to one of three one-half hour viewing conditions: Misterogers Neighborhood (MR), Sesame Street (SS), or neutral films used in local schools (N) about animals, health and nature. Prior to intervention (viewing) all children

were individually tested for IQ and imaginativeness and observed twice during free play periods by two trained observers. There were no significant differences between the groups in age, sex, IQ, or imaginativeness of observed play prior to intervention.

Insert Table 1 about here

Measures

IQ. IQ measures were obtained from individual administration of the Peabody Picture Vocabulary Test according to the manual (12).

Observation variables. Children were observed during free play for two ten-minute periods prior to intervention, for five minute periods while viewing during intervention, and for two ten-minute periods after intervention. Observations were written down and rated by trained research assistants. Scales from 1 to 5 of the operational definitions of the following variables were used: Imaginativeness, Positive Affect, Concentration, Interaction with Adults, Interaction with Peers, Cooperation with Adults, Cooperation with Peers and the following mood variables: Fearfulness, Anger, Sadness, Fatigue, Liveliness, and Elation (38, 39, 40).

Interrater reliability was determined in accordance with a statistic designed specifically to assess the extent of observer agreement (7). Reliabilities ranged from .78 to .99 (See Table 2).

Insert Table 2 about here

During intervention, the children watched their program in groups no larger

than six for ten consecutive nursery school days. Observations of five minute samples of behavior were recorded during viewing. Immediately following the daily viewing, the children returned to their classrooms and were individually questioned about material specific to that day's programming. Finally, in the week following intervention, the spontaneous play behaviors of the children were again recorded by two trained research assistants for two separate ten-minute intervals. Independent measures were age, sex, IQ, imaginativeness of observed play prior to intervention, visual attention during viewing, and viewing condition. Dependent measures were recall percentages and behavioral changes. Recall percentages were obtained for (1) all questions, (2) factual information, (3) inferential information, (4) recognition of a previously presented message and (5) recall of a message without a recognition stimulus. Behavioral change measures were differences between the average of the four pre-intervention observations and the average of the four post-intervention observations.

Recall questions. The recall study was based only on Sesame Street and Misterogers. A pool of 200 questions, 10 per show per program, was developed based on detailed analysis of each individual segment stressed during a particular show. Next, three of the four principal researchers agreed on 50 questions per condition, 5 for each show, attempting to balance difficulty across shows and across conditions. Questions were further subdivided into those requiring memory of Factual Information or of Inferential and again sorted according to whether a concrete visual stimulus could be presented thus permitting visual recognition rather than recall memory. There were 28 Factual and 22 Inferential

questions for MR, 27 Factual and 23 Inferential for SS. For MR, 41 were recall and 9 recognition; for SS, 39 were recall and 11 recognition.

RESULTS

The Memory Study. The recall questions were not piloted and, therefore, equivalence of difficulty for the two programs and in the different categories cannot be firmly claimed. Although three researchers agreed on the selection and categorization of the questions, only a research design in which the same children watched each program and answered all questions would have permitted assurance that the level of difficulty and categorization were the same for each program. Indeed, the item analysis suggests that items from Misterogers Neighborhood had a greater range of difficulty. For this reason, conclusions about differences between the programs must be speculative.

I. Memory for program content

Type of question by format. Results were first analyzed by comparing type of question by stimulus format (show). As seen in Table 3, no significant difference in percentage of all questions answered correctly emerged. The variance in SS is, however, significantly greater than for MR, ($F(1,49) = 2.236$, $p = .01$), suggesting more uneven memory for content of the show. In addition, there were significant differences in percentages of Factual ($t(40) = 2.18$, $p = .035$) and of Recognition questions ($t(40) = 5.47$, $p < .001$) with children in the MR condition performing better, and of Inferential questions ($t(40) = 2.09$, $p = .044$) with SS children doing better.

Of greater interest, however, is the differential performance within the programs. In MR, children performed significantly better on Factual compared

to Inferential questions ($t(40) = 4.13, p < .001$) and on Recognition as opposed to verbal Recall questions ($t(40) = 19.12, p < .001$). Differences for SS children only approached statistical significance, with Inferential recall superior to Factual ($t(40) = 1.267, p = .078$) and Recognition superior to Recall ($t(40) = 1.735, p = .084$).

Insert Table 3 about here

Type of question by format by child characteristics.

1. Sex. Anovas of sex x program for the five percentage indices approached statistical significance in three categories: Total ($F(1,40) = 3.589, p = .066$), Factual ($F(1,40) = 3.931, p = .055$) and Recall ($F(1,40) = 3.477, p = .070$). On SS girls performed significantly better than boys on Total, Factual, and Recall questions and approached significance on Inferential. In an interesting reversal, on Recognition question, the boys in the MR condition did better than the girls.

Insert Table 4 about here

IQ. IQ, which was expected to have an effect on all types of questions yielded significant findings for Total ($F(1,40) = 3.43, p = .044$), Inferential ($F(1,40) = 3.910, p = .020$) and Recognition ($F(1,40) = 4.586, p = .039$) with higher IQ children doing better. Closer analysis, however, showed that these effects pertained to Sesame Street and only for Inferential and Recognition questions, with high IQ children scoring better on both types of memory tasks than average

IQ children.

Insert Table 5 about here

Imagination. It was hypothesized that more imaginative children would remember more from MR and less from SS. For MR children, more imaginative children remembered significantly more on Inferential questions ($t(19) = 2.151$, $p = .05$), and on Recall questions, (those without a concrete stimulus), $t(19) = 2.340$, $p = .03$, and approached significantly more on Total ($t(19) = 2.026$, $p = .06$).

Age. Differences linked to age were expected. While age had no significant effect on percentages of questions answered correctly across all content categories for the combined programs, closer analysis showed significant effects with older children performing better than younger children only in the Misterogers condition on Total ($t(19) = 2.467$, $p = .02$), Factual ($t(19) = 2.191$, $p = .04$), Inferential ($t(19) = 2.590$, $p = .02$) and Recall ($t(19) = 2.259$, $p = .04$) percentages. Only on the more concrete Recognition questions did younger children in the Misterogers condition do as well as older children. There were no significant differences for Sesame Street.

In general the findings for reactions immediately after viewing indicate, within the limitations of design mentioned above, that stimulus format can make quite a difference in how much a child takes away from a given program. Indeed, our indications suggested that while in general children watched Sesame Street more attentively than Misterogers, the heightened attention did not yield greater effects for recall. If anything, the rapid pace and cluttering of material

in SS may have impeded cognition for the children watching that show, particularly the less intelligent boys. The data indicate that only the very bright girls who saw Sesame Street picked up more inferential material from that show. In keeping with the analysis of Meichenbaum and Turk (26) the rapid and cluttered format of Sesame Street may be presenting problems for those very children whom one would most hope could benefit from the cognitive message of the program i.e., the less verbal, less intelligent boys.

Study 2: Cumulative Behavioral Effects

For this set of results there were three viewing-groups, children who watched Misterogers, Sesame Street or the nature and animal films exclusively over a two-week period.

One-way analyses of variance for overall changes in Imagination, Positive Affect, Concentration, Interaction with Adults and with Peers, Cooperation with Adults and with Peers, were not significant. However, in accordance with the original thesis that child characteristics would interact with program effects, the behavioral change scores were analyzed in a series of 3 x 2 Anovas, with viewing condition by age, IQ and Baseline Imagination, all broken at the median, and by sex. Although a 3 x 2 x 2 x 2 x 2 design (condition by IQ by age by sex by imagination) would have been preferable since it would have provided for orthogonality, the limited number of subjects relative to variables in this experiment would have resulted in disproportionate if not empty cells. Results are reported by child characteristic and viewing condition for age, sex, IQ and imagination, on the set of seven dependent variables: Imaginativeness, Positive Affect, Concentration, Interaction with Adults, Interaction with Peers, Cooperation

with Adults, and Cooperation with Peers.

Age. The age of the child had no significant effects alone or in interaction with the viewing conditions on any of the changes in observed behaviors. The hypothesis that older children would show greater gains in the television conditions was not supported.

Sex. The sex of the child had no significant effects alone or in interaction with the viewing conditions on any of the changes in observed behaviors. The hypothesis that boys would show greater gains in the television conditions was not supported.

Intelligence. Level of IQ had a significant effect in interaction with viewing condition on Interaction with Adults ($F(2,44) = 4.443, p = .018$) and Cooperation with Adults ($F(2,26) = 4.221, p = .026$), but not on Imaginativeness of Play, Positive Affect, Concentration, Interaction and Cooperation with Peers. The hypothesis that brighter children might show greater behavioral gains in the television conditions was not supported.

Closer analysis shows that the variance in SS stems from average IQ children decreasing their social interactions while high IQ children increased them ($t(19) = 3.334, p < .01$). This is in sharp contrast to the reverse findings for children who watched MR or the control films.

In Cooperation with Adults, while IQ tended to have the same effect for SS viewers ($T(8) = 1.90, p = .10$), the interaction can really be attributed to differences between children of average IQ in MR and SS conditions. Following MR, the average IQ children showed an increase in Cooperation while following SS they decreased in Cooperation ($t(8) = 2.505, p = .035$).

Baseline Imagination. The level of imaginativeness of play prior to intervention had significant effects on changes in Imaginativeness, Positive Affect, Concentration,

and showed an effect approaching significance on Interaction with Peers. (See Tables 6 and 7 and Figures 1 and 2).

Insert Tables 6 and 7 and Figures 1 and 2 about here

Imaginativeness of play. Level of baseline imagination had a significant effect, ($F(1,52) = 28.951, p = .001$), with less imaginative children changing significantly more than initially highly imaginative children. This was true for MR ($t(19) = 3.702, p < .01$); for SS ($t(19) = 2.44, p = .024$), and for N ($t(14) = 2.910, p = .012$).

The first planned comparison, that children low in baseline imagination would increase in the television conditions relative to little change for all children in the film conditions and all initially high imagination children approached significance ($F(1,52) = 3.698, p < .10$). The second planned comparison, that this discrepancy would show greatest gains for initially low imagination children who watched MR was highly significant ($F(1,52) = 20.126, p < .001$).

Positive Affect. In a 2×3 Anova (level of imaginativeness by viewing condition) level of baseline imagination had a significant effect ($F(1,52) = 15.862, p < .001$) on change in Positive Affect following intervention. A closer look at this main effect shows that it was only true for MR ($t(19) = 2.269, p = .036$) and N ($t(14) = 4.039, p = .01$) but not for SS. In MR the difference was due mainly to an increase for less imaginative children while in the control films it was more attributable to a decrease for the highly imaginative children. Increases in Positive Affect for highly imaginative

children following MR and SS were significant but no increases followed for the control films (for MR, $t(15) = 2.158$, $p = .05$; for SS, $t(16) = 2.255$, $p = .033$).

Concentration. Baseline imagination had a main effect on change in Concentration also ($F(1,52) = 8.320$, $p = .006$). Within specific viewing condition the change was statistically significant only for MR viewers ($t(19) = 2.086$, $p = .052$). Of importance is the finding that the less imaginative children increased in Concentration in all three conditions.

Interaction with Peers. Baseline imagination approached a significant main effect on change in Interaction with Peers ($F(1,151) = 2.812$, $p = .100$). Analysis of the individual programs shows the variance to rest within SS, with children low in baseline imagination increasing in Interactions while those who were high initially in imaginativeness decreased slightly in their interactions ($t(18) = 2.055$, $p = .054$).

Correlational Data

An interesting possibility of the present study is consideration of the association between imagination and other aspects of behavior. Correlational analysis permits such a cluster of behaviors to be identified. Children who show Imagination in their play also tend to show Positive Affect, a high level of Concentration, many Interactions with Peers, and Cooperation with other children. (See Table 8).

Insert Table 8 about here

Discussion

Effects of viewing condition on behavior change could be seen although they

were not large. The magnitude was probably attributable to the upper-middle class status of the children as much as to anything else. Work by Smailansky (42) and by Stein and Friedrich (44) has shown that the amount of behavioral improvements resulting from modeling interventions is closely related to socioeconomic status: the higher the status of the child's parents, the lower the impact of the intervention. In addition, middle class children have less room for "improvement" (25, 43). Indeed, the high negative correlations between the baseline measures and the changescores (see Table 9) is most easily explained by considering a ceiling effect on the measurement scales: the children initially scoring high on a behavior simply had nowhere to go but down.

Insert Table 9 about here

When characteristics of the children were considered in interaction with the viewing conditions, some interesting results emerged: a child's level of IQ affected his relationship to adults following viewing and the child's baseline level of imagination affected subsequent Imaginativeness, Positive Affect, Concentration and Interaction with Peers in some rather subtle interactions with the program viewed.

IQ. Average IQ children in SS decreased their interactions with adults while high IQ children increased them. The decrease, seen with all children in the other conditions, may reflect a growing independence of the preschool child, a progressive lack of need to rely on an adult. The high IQ children may have increased their interactions with adults by initiating interactions of a new kind, perhaps for clarification of intriguing complex information or for stimulation.

The finding that average IQ children who watched MR became more cooperative with adults while those who watched SS became less so may reflect the primary interactions modeled by the program format: the low-key consistent emphasis on Misterogers' direct relationship to the viewing child contrasts with the multiple interactions and varied reinforcements on SS (8,9). While the high IQ children who watched MR also increased in Cooperation with Adults, the high IQ children in SS dropped only slightly, leaving the difference without statistical significance. Nonetheless, it further suggests that the child who is not above average in intelligence may be less able to extract the message of cooperation with adults from the more stimulating and complex format of Sesame Street.

Baseline imagination. The other child characteristic to have major effects on changes in behavior was initial imaginativeness of observed play. While the children originally high in Imagination did show slight but insignificant drops in imaginativeness of play following viewing, the increases for children low in imagination initially were striking. This suggests that (1) a "regression toward the mean" interpretation is inadequate in explaining the changes of children in the television conditions and (2) either the level of imaginativeness of the initially more imaginative children was more stable - i.e., less likely to change - or a ceiling effect of the scale was operative. If stability is accepted as an interpretation, it would mean that imaginativeness may be a behavior susceptible to improvement but, once developed, resistant to destruction.

If that is the case, the improvements of the less imaginative children in not only Imagination but also Positive Affect and Concentration and Interactions with Peers is provocative: might these less imaginative children be

acquiring a repertory of behaviors which are of personal as well as social value? Both television programs helped the initially low-imagination children improve, whereas the films did not; MR helped them particularly in developing their imaginative play. Clearly, television viewing was shown to play a beneficial role in the development of these children.

Finally, the cluster of characteristics that repeatedly fall together deserves comment. Positive Affect, Concentration, Interaction with Peers and Cooperation with Peers were significantly correlated with Imagination. Despite high correlations between several of the scales, independence of the measures can be claimed by pretraining of raters and definition: children can be delighted while playing a very non-imaginative, rough-and-tumble game; they can exhibit a high level of concentration while drawing a picture or manipulating blocks. Similarly, they are able to interact and cooperate with other children when digging in mud, jumping off playground equipment, cooking, or playing a structured game, all common activities available during free play at the nursery school in this study. Nothing in the scoring procedures suggests an automatic linkage of these variables. Clearly, a causal relationship cannot be inferred from the correlations. Nonetheless, according to a cognitive-affective theory of human behavior, the availability of imagery as a cognitive skill may enhance the likelihood of the other behaviors (38). The reduction in or production of novelty resulting from its exercise results in the positive emotions of joy or interest. This pleasure tends to self-perpetuate, producing prolonged concentration. Social benefits of interaction and cooperation result from improved empathy and self-acceptance and eagerness for the input of others. The influence of imagination on information-processing is strong: it is

assimilation. Presumably the small child who is accomplished in its use will be better equipped to filter information - including that which is televised - for alternative ways of behaving and for truthfulness.

The current research indicates that such "prosocial" uses of television are possible. More research is needed in order that we may be better able to specify conditions of content and format which aid children in learning from a program and characteristics of the child which abet or retard a program in achieving its objectives. Our data suggest that while Sesame Street does indeed entertain children and hold their attention it is less effective in promoting storage of the material by less verbally intelligent children. The format of Misterogers seems to have special advantages in promoting comprehension and in building up constructive imaginative play in children who are initially less imaginative. As previous research has suggested joint adult-child viewing or encouragement of imaginative play through TV and direct adult modeling may be especially helpful to children who seem less playful, more distractible and moody. Results from an even more recent study still under way by J. Singer and D. Singer with 141 preschoolers indicate that children rated as overly aggressive, i.e. attacking other children or damaging property, are significantly less likely to be watching Misterogers (according to home logs) than unaggressive children (40). The positive findings that come up in so many studies with relation to this program suggest that producers and mental health workers ought to take a closer look at the format of Misterogers as a basis for developing programming that can relatively quickly lead to increases in personally and socially constructive behaviors in preschoolers.

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Table 1
Characteristics of Children
in Each Viewing Condition

Characteristic	Viewing Condition					
	MR		SS		H	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Age(months) ^a	49.0	4.73	49.8	5.49	51.2	3.57
IQ ^b	115.1	11.58	114.7	13.91	116.8	10.50
Baseline Imagination ^c	2.5	1.00	2.7	.86	2.5	.90
Sex:	Number					
Males	10		12		6	
Females	11		9		10	

^aMedian age was 49.5 months.

^bScore based on Peabody Picture Vocabulary Test. Median score was 116.5.

^cAverage of four pre-intervention observations on a one to five scale. The median of the Baseline Imagination scores was 2.74

Table 2
Interrater Reliabilities for Observed
Variables Pre, Post and Overall^a

Variable	Reliability Coefficient		
	Pre	Post	Overall
Imagination	.79	.85	.82
Positive Affect	.85	.91	.88
Concentration	.84	.90	.87
Interaction/Adults	.84	.92	.88
Interaction/Peers	.81	.91	.86
Cooperation/Adults	.89	.91	.90
Cooperation/Peers	.88	.86	.88
Fear	.92	.98	.95
Anger	.93	.95	.94
Sadness	.87	.99	.93
Fatigue	.92	.96	.94
Liveliness	.80	.88	.84
Elation	.78	.88	.83

^aReliability coefficients obtained according to Cicchetti, 1976.

Table 3
Mean Percentages of Questions
Answered Correctly by Type of
Question and TV Condition

Type of Question	TV Condition					
	<u>Misterogers</u> (n=21)		<u>Sesame Street</u> (n=21)		<u>t</u>	<u>p</u>
	Mean	S.D.	Mean	S.D.		
Total	45.5	9.25	44.7	13.77	.23	.500
Factual	50.7	10.76	42.3	13.50	2.18	.035*
Inferential	39.0	10.33	48.1	16.57	2.09	.044*
Recognition	81.0	10.00	50.6	22.76	5.47	.001*
Recall	36.6	11.22	43.3	14.61	1.63	.112

Table 4
Mean Percentages of Type of Question
Answered Correctly by Sex and TV Condition

Type of Question	MR (n=21)					
	Male (n=10)		Female (n=11)		<u>t</u>	p
	Mean	S.D.	Mean	S.D.		
Total	45.1	11.44	45.9	7.74	n.s.	
Factual	49.3	13.54	52.0	8.63	n.s.	
Inferential	40.6	13.00	37.5	8.18	n.s.	
Recognition	86.0	6.73	76.4	11.00	4.74	.001
Recall	38.8	11.94	34.3	11.11	n.s.	

	SS (n=21)					
	Male (n=12)		Female (n=9)		<u>t</u>	p
	Mean	S.D.	Mean	S.D.		
Total	39.3	15.58	51.9	7.89	2.30	.03
Factual	37.1	15.39	49.1	7.73	2.23	.04
Inferential	42.1	18.56	56.1	11.04	2.05	.06
Recognition	45.6	24.53	57.2	21.17	n.s.	
Recall	37.8	16.01	50.7	9.98	2.17	.04

Table 5
Mean Percentages of Type of
Question Answered Correctly
by IQ and TV Condition

Type of Question	MR (n=21)				
	Hi IQ (n=11)	Average			
		IQ (n=10)			
	Mean	S.D.	Mean	S.D.	<u>t</u>
Total	47.1	10.33	43.8	8.55	n.s.
Factual	50.9	11.60	50.5	10.98	n.s.
Inferential	40.9	12.04	36.8	8.82	n.s.
Recognition	80.5	11.09	81.5	9.80	n.s.
Recall	38.8	11.93	34.3	11.11	n.s.

	SS (n=21)				
	Hi IQ (n=11)	Average			
		IQ (n=10)			
	Mean	S.D.	Mean	S.D.	<u>t</u>
Total	50.2	8.66	38.6	16.78	n.s.
Factual	46.1	9.94	38.1	16.69	n.s.
Inferential	55.6	11.16	39.9	18.94	2.17*
Recognition	61.4	17.30	38.6	23.94	2.36*
Recall	47.2	10.27	39.1	18.49	n.s.

2

Table 6
Means and S.D.'s of Changes in Observed
Behaviors by Viewing Condition and
Baseline Level of Imaginativeness

Behavior	Viewing Condition					
	<u>Misterogers</u>		<u>Sesame Street</u>		<u>Control Films</u>	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Imagination						
High Imaginative	-.389	1.140	-.396	1.180	-.594	.844
Low Imaginative	1.375	.843	.972	1.228	.813	1.024
Positive Affect						
High Imaginative	-.222	.667	-.083	1.008	-1.063	.821
Low Imaginative	.542	.797	.389	1.244	.656	.925
Concentration						
High Imaginative	-.194	.576	.083	.694	-.469	1.039
Low Imaginative	.500	.898	.611	1.420	.500	.964
Interaction/Adults						
High Imaginative	-.514	1.348	-.400	1.207	-.714	.836
Low Imaginative	-.056	1.111	-.787	1.240	.312	.662
Interaction/Peers						
High Imaginative	-.194	.756	-.273	.884	-.219	1.187
Low Imaginative	.194	1.197	.843	1.308	-.292	.910
Cooperation/Adults						
High Imaginative	.417	1.516	-.083	.935	-.750	.750
Low Imaginative	.321	.918	-.521	1.035	.095	1.161

Table 6; continued

Cooperation/Peers	Mean	S.D.	~~Mean~~	S.D.	Mean	S.D.
High Imaginative	.143	1.009	-.367	1.101	-.583	1.612
Low Imaginative	.575	1.642	.926	1.648	-.917	.687

Table 7

Analysis of Variance on Observed Behaviors:

Viewing Condition by Baseline Level of Imaginativeness

ANOVA TABLES			
Behavior	<u>MS</u>	<u>df</u>	<u>F</u>
Imagination			
Condition(A)	.692	2	.622
Imagination(B)	32.236	1	28.951***
AB	.224	2	.201
Within	1.113	52	
Positive Affect			
Condition(A)	.809	2	.939
Imagination(B)	13.666	1	15.862***
AB	1.996	2	2.317
Within	.862	52	
Concentration			
Condition(A)	.521	2	.577
Imagination(B)	7.514	1	8.320**
AB	.233	2	.258
Within	.903	52	

Table 7 , continued

Interaction/Adults	<u>MS</u>	<u>df</u>	<u>F</u>
Condition(A)	.704	2	.585
Imagination(B)	1.654	1	1.375
AB	2.083	2	1.731
Within	1.203	46	

Interaction/Peers			
Condition(A)	1.335	2	1.203
Imagination(B)	3.169	1	2.8129
AB	1.665	2	1.478
Within	1.127	51	

Cooperation/Adults			
Condition(A)	1.698	2	1.415
Imagination(B)	.089	1	.074
AB	1.201	2	1.000
Within	1.200	28	

Cooperation/Peers			
Condition(A)	4.814	2	2.5329
Imagination(B)	2.029	1	1.068
AB	2.081	2	1.095
Within	1.901	38	

* $p < .10$ ** $p < .01$ *** $p < .001$

Table 8
Correlations of Observed Imaginativeness of Play
and Other Behaviors Observed Pre and Post

Behavior Correlated	Time of Observation	
	Pre	Post
Positive Affect	.703***	.799***
Concentration	.651***	.642***
Interaction/Peers	.522***	.597***
Cooperation/Peers	.451***	.315*
Fear	-.514***	n.s.
Sadness	-.398***	n.s.
Fatigue	-.408***	n.s.
Liveliness	.505***	.623***
Elation	.595***	.602***

* $p < .05$.

*** $p < .001$.

Table 9

Pearson r Correlations Between Pre and Change
Measures of the Observed Behaviors

Behavior	Measure Correlated Pre-Change
Imaginativeness	-.532***
Positive Affect	-.633***
Concentration	-.710***
Interaction/Adults	-.624***
Interaction/Peers	-.613***
Cooperation/Adults	-.592***
Cooperation/Peers	-.673***

***p < .001

Pre-Post Viewing Behavior Change

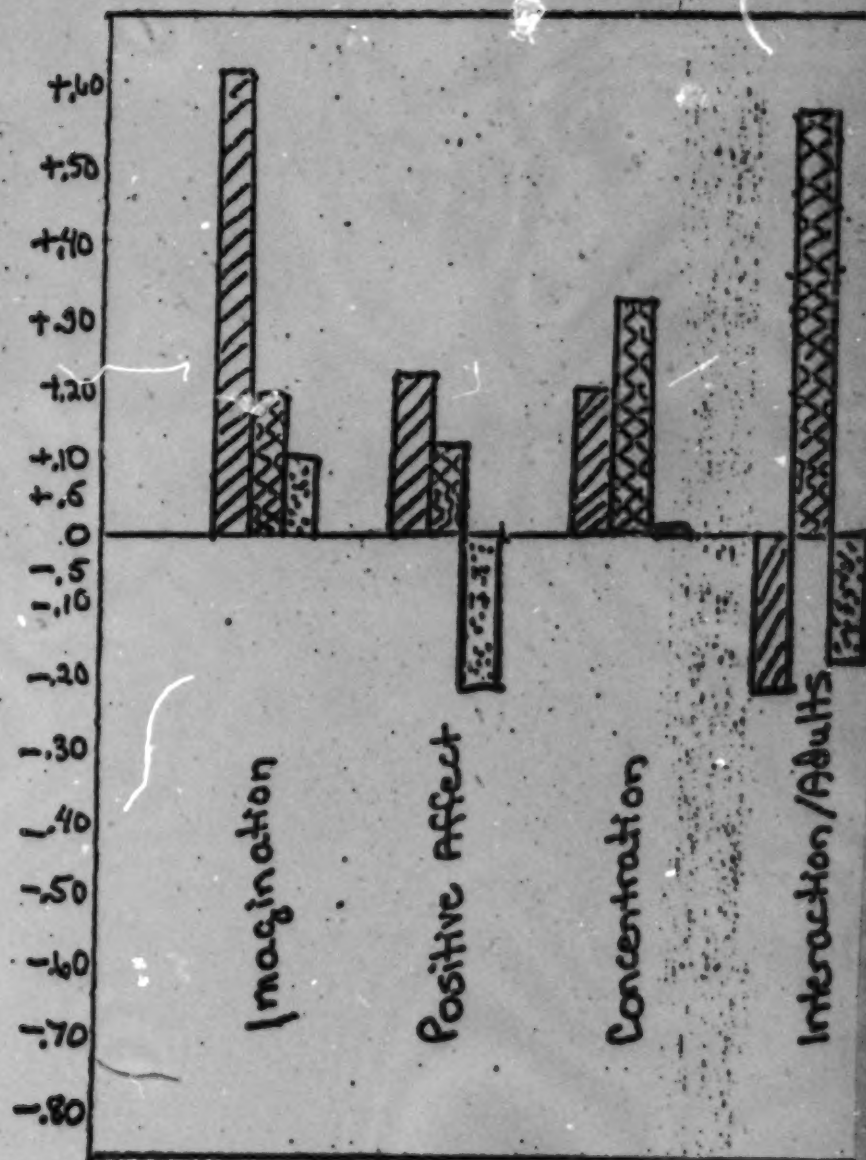
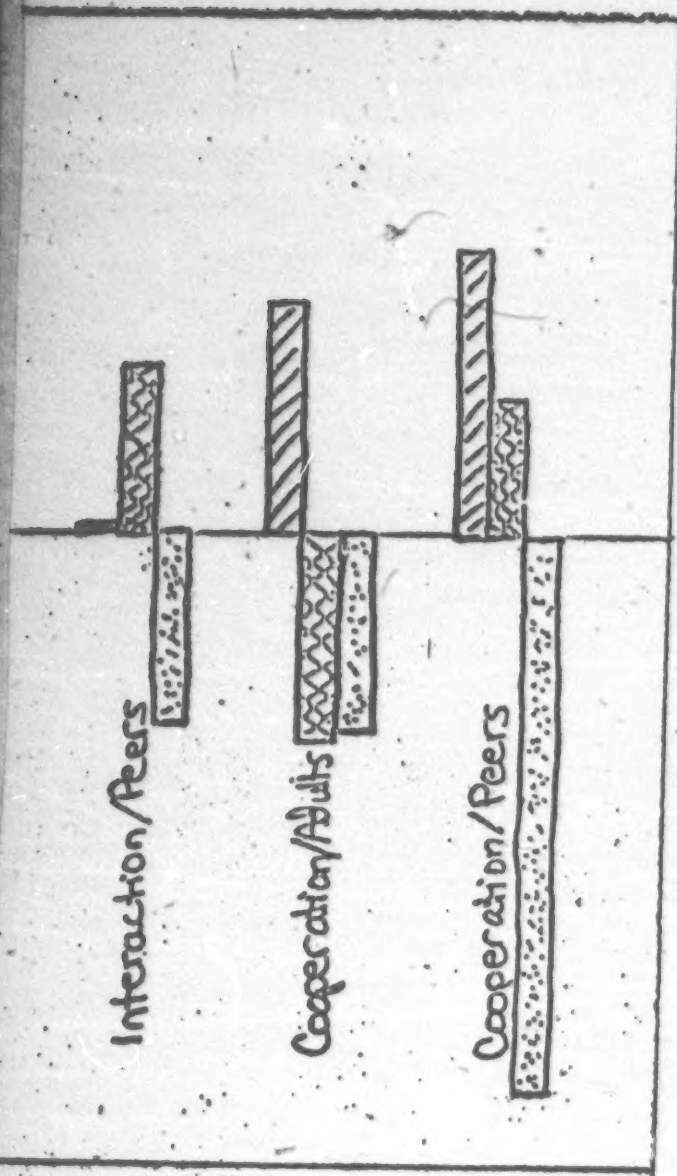
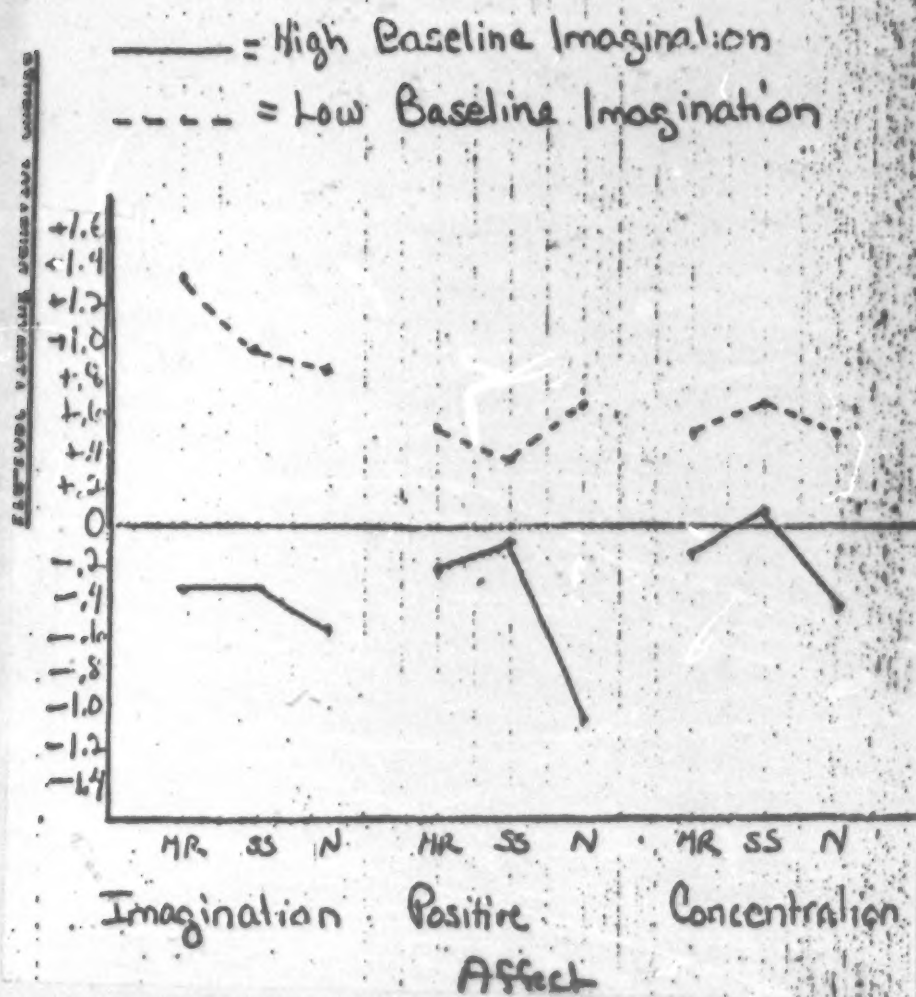


Figure 1. Changes in Behaviors

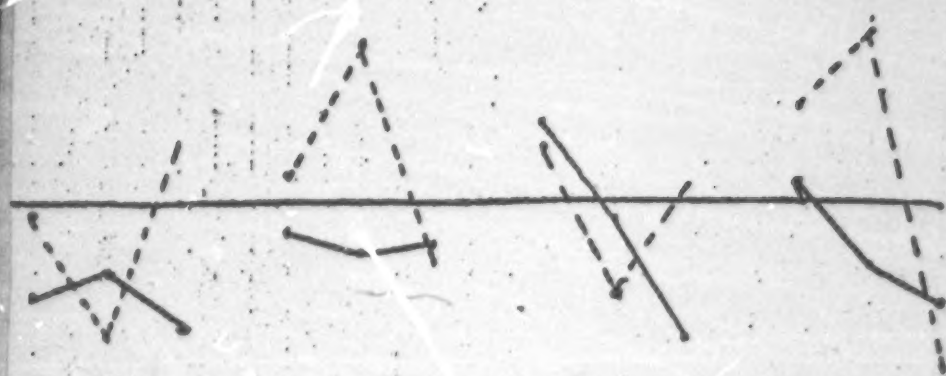


by Viewing Condition

Figure 2
Interactions of Baseline
TV Condition on



Imagination and Observed Behaviors



MR	SS	N	MR	SS	N	MR	SS	N	MR	SS	N
Interacting/			Interaction/			Cooperation/			Cooperation/		
Adults			Peers			Adults			Peers		